



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/531,634	11/17/2005	Jae-Ho Jung	51876P840	6230
8791 7590 10/02/2008 BLAKELY SOKOLOFF TAYLOR & ZAFMAN LLP 1279 OAKMEAD PARKWAY SUNNYVALE, CA 94085-4040				
EXAMINER				
MALEK, LEILA				
ART UNIT		PAPER NUMBER		
2611				
MAIL DATE		DELIVERY MODE		
10/02/2008		PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/531,634

Applicant(s)

JUNG ET AL.

Examiner

LEILA MALEK

Art Unit

2611

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 April 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 2, 6 and 7 is/are rejected.
- 7) ☒ Claim(s) 3-5 and 8-10 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 April 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/S508)
Paper No(s)/Mail Date 06/30/2008
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Priority

1. Applicants' claim for the benefit of a prior-filed application under 35 U.S.C. 119(e) or under 35 U.S.C. 120, 121, or 365(c) is acknowledged.
2. Acknowledgment is made of applicants' claim for foreign priority under 35 U.S.C. 119(a)-(d). The certified copy has been filed in parent Application No. 10/531,634, filed on 04/14/2005.

Information Disclosure Statement

3. The information disclosure statement submitted on 06/30/2008 has been considered and made of record by the Examiner.

Drawings

4. Figures 1 and 2 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

5. Claim 1 is objected to because of the following informalities: as to claim 1, line 29, "0array" needs to be replaced by array. Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1, 2, 6, and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over background of invention further in view of Jin et al. (hereafter, referred as Jin) (US 6,449,466).

As to claim 1, Applicants in the background of invention disclose an adaptive array antenna system (see Fig. 1), comprising: modulation means 101 having a plurality of modulators for generating transmitting data corresponding to the number of users (see page 6, lines 36-37 - page 7, line 1); beam forming means 102 (see page 7, line 1-4) having a plurality of beam formers for generating a multiplexed data by multiplexing the generated transmitting data to a beam forming weight; vector addition means 103 for generating sum data by adding outputs of the beam forming means corresponding to a user (see page 7, lines 5-8); array error compensation means 108 for generating error compensated data by multiplexing a reverse of a transfer function of an array transmitting means to the sum data from the vector addition means 103 (see page 7, lines 8-10) by using a compensation signal inputted through a frequency down conversion means 114; compensation signal extraction means 113 for extracting a compensation signal from an output signal of the array transmitting means 110 and outputting the compensation signal; frequency down-conversion means 114 for

generating a converted signal by frequency-down converting the compensation signal; array transmitting means 110 for converting the signal from the array error compensation means to an analogue signal and frequency-up converting the analogue signal (see page 7, lines 10-13); and array antenna 115 for transmitting an output signal passed through the compensation signal extraction means 113. Applicants in the background of invention disclose all the subject matters claimed in claim 1, except for array linearization means for receiving the error compensated data from the array error compensation means, generating linearized signal by linearizing the error compensated data by using the compensating signal from the frequency down conversion means and transferring the linearized signal to the array transmitting means. Jin, in the same field of endeavor, discloses an array antenna system (see Fig. 3), comprising: an array linearization means 305 (see Fig. 3) for receiving an input data signal and, generating linearized signal by linearizing the data signal by using the compensating signal from the frequency down conversion means 335 and transferring the linearized signal to the array transmitting means 255 (see column 7). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Applicants' background of invention as suggested by Jin to correct the amplification distortion caused by the RF power amplifier in the transmit path (see column 2, lines 21-23). Jin does not expressly disclose that the array linearization means receives the error compensated signal, however since the purpose of using a pre-distorter in transmitter is only to correct the amplification distortion caused by the RF power amplifier, the position of pre-distorter at the transmitter is a matter of design choice. Therefore, it would have been obvious to

one of ordinary skill in the art at the time of invention to combine the teachings of Applicants in the background of invention with Jin's teachings and place the pre-distorter for instance after the array error compensator to meet the design requirements of the system.

As to claim 6, Applicants in the background of invention disclose a method comprising the steps of: a) generating transmitting data corresponding to the number of users (see Fig. 1, block 101); b) generating multiplexed data by multiplexing the transmitting data with a beam forming weight (see block 102); c) generating sum data by adding the multiplexed data (see adders 103); d) generating error compensated data by compensating the transmitting signal by frequency down converting an output signal of the adaptive array antenna system (see blocks 108, 110, 113, and 114). Applicants in the background of invention disclose all the subject matters claimed in claim 6, except for linearizing the error compensated data from the step d) by frequency-down converting the compensation signal and the output signal of the adaptive array antenna system. Jin, in the same field of endeavor discloses an array antenna system (see Fig. 3), comprising: an array linearization means 305 (see Fig. 3) for receiving an input data signal and, generating linearized signal by linearizing the data signal by using the signal from the frequency down conversion means 335 and the output signal of the array antenna system 300 (see, column 7). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Applicants' background of invention as suggested by Jin to correct the amplification distortion caused by the RF power amplifier in the transmit path (see column 2, lines 21-23). Jin

does not expressly disclose that the array linearization means receives the error compensated signal; however since the purpose of using a pre-distorter in transmitter is only to correct the amplification distortion caused by the RF power amplifier, the position of pre-distorter at the transmitter is a matter of design choice. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to combine the teachings of Applicants in the background of invention with Jin's teachings and place the pre-distorter after the array error compensator to meet the design requirements of the system.

As to claims 2 and 7, Applicants in the background of invention further disclose that the array error compensation means 108 includes: error compensation signal generation means 104 for generating a digital error compensation signal to be injected to a channel in order to estimate the transfer function of the array transmitting means; error compensation signal injection 105 for generating digital transmitting data by adding an output vector of the vector addition means 103 and a vector of the digital error compensation signal vector; error compensation coefficient estimation means 106 for estimating an error compensation coefficient of each channel by considering relation between the compensation signal from the frequency down conversion means 114 and the error compensation signal generated from the error compensation signal generation means 104; and error compensation means 107 for multiplexing a reverse of the error compensation coefficient to the digital transmitting data (see page 7, lines 8-10) generated from the error compensation signal injection means 105 in each transmitting

channel of the array transmitting means 110 and transferring a result of the multiplexing to the array transmitter means.

Allowable Subject Matter

7. Claims 3-5 and 8-10 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LEILA MALEK whose telephone number is (571)272-8731. The examiner can normally be reached on 9AM-5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad Ghayour can be reached on 571-272-3021. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Leila Malek
Examiner
Art Unit 2611

/L. M./
/Leila Malek/
Examiner, Art Unit 2611

/Mohammad H Ghayour/
Supervisory Patent Examiner, Art Unit 2611